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(54) ANISOTROPICALLY ETCHING METHOD FOR SILICON SUBSTRATE AND MANUFACTURE OF SOLAR CELL

(57) Abstract:

PROBLEM TO BE SOLVED: To deeply form anisotropically etched pits into an Si substrate surface by introducing an etching gas conc. at least either ClF_3 or XeF_2 into a reactor chamber at the atmospheric pressure, and etching the substrate surface at specified temp. with this gas to form anisotropically etched pits thereinto.

SOLUTION: A ClF_3 gas is fed into a reaction chamber 13 at room temp. and atmospheric pressure, at a rate of 0.2 lit./min. with N_2 fed at 2 lit./min. to etch Si 100 and 111 substrate for 2 min. at room temp., thereby forming rectangular and pyramid-like etched pits into the (100)- and (111)-plane substrates. The temp. rise in the structure due to the heat may change the isotropic etching, and hence substrate temp. is suppressed below 130°C . After cooling the substrate, the above steps are repeated to make the anisotropic etching, thus forming a deep irregularities structure. Thus, a substrate having square and pyramid etched pits is formed.

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